

## Notes from Follow Up Correspondence with NRG Energy Regarding Data Submittal

This summary documents EPA's follow-up correspondence with NRG Energy regarding the data that NRG Energy submitted to EPA on February 21, 2014 (DCN SE04678) in response to EPA's January 17, 2014 data request to NRG Energy (DCN SE04658).

On April 28, 2014, EPA provided NRG Energy with a list of questions related to the submitted Keystone data (DCN SE04318A1). EPA, ERG, and Westat participated in a call with NRG Energy on May 1, 2014 to discuss the follow up questions.

The following people participated in the call:

EPA Personnel	NRG Energy Personnel	ERG Personnel	Westat Personnel
Ron Jordan	Stephen Frank	TJ Finseth	Yan Zhuang
Cuc Schroeder	Mark Jacklin	Dan-Tam Nguyen	
	David Read		
	Luke Weaver		

The following questions were discussed during the call, with NRG Energy's responses described after each question.

### Unit Shut Downs

1. Unit 2 was shut down from 9/8/12 through 11/4/12. What was the reason for the shut down?
2. Unit 1 was shut down from 10/27/12 through 11/23/12, and then again from 11/27/12 through 12/8/12. What was the reason for the shut downs?

**NRG Energy Response:** NRG Energy stated that all the shut downs were scheduled routine shut downs or shutdowns related to typical maintenance issues associated with operating a power plant. NRG Energy stated that the issues were not due to any operational issues with the FGD system or the FGD wastewater treatment system.

3. How was the FGD wastewater treatment system being operated between 10/27/2012 and 11/4/2012, when both units at the plant were shut down? For example, please explain the following:
  - Was newly generated wastewater being transferred to the system?
  - If so, please explain from which process this wastewater was generated.
  - Was the FGD wastewater treatment system operating in some type of recirculation mode?
  - How does the flow rate through the process during this time compare to the flow rate during normal operation?
  - What chemicals were being added to the FGD wastewater treatment system during this time and what were the corresponding dosages of the chemicals?
  - How do the chemical dosages used during this time compare to the dosages during normal operation?

- Please explain any other changes regarding the operation of the FGD wastewater treatment system during this time.
- Why did the plant continue to discharge FGD wastewater during this period?

NRG Energy Response: NRG Energy stated that each of the two operating FGD systems has 1.8 million gallons of water in the system. During a shut down, NRG Energy attempts to hold on to the water in the absorbers to maintain the chemistry in the FGD system, but they may blowdown some of the water to get the system to a more desirable density. The blowdown is then processed through the wastewater treatment system. The plant does not completely empty the absorbers during this time. NRG Energy also noted that process water from the equalization tank (210,000 gallons) can continue to be processed through the wastewater treatment system during a shutdown. Also, the facility may continue processing sludge from the sludge holding tank (250,000 gallon capacity), which generates additional process water that is transferred to the equalization tank. When the sludge is processed, it generates a somewhat cleaner water, which can negatively impact the performance of the solids contact clarifier in the wastewater treatment system by flushing some of the solids out and reducing the solids in the sludge blanket layer.

NRG Energy sometimes operates the system in a recirculation mode when starting up from a shut down period, but they limit the amount of time they are in recirculation mode to a maximum of eight to ten hours. NRG Energy minimizes the amount of time they are in recirculation mode because the return of too much treated water can impact the performance of the solids contact clarifier.

NRG Energy stated that during the period when both units were shut down, the FGD wastewater treatment system was off line more than it was on line. During the periods when the treatment system was operating, the chemical dosages remained the same. NRG Energy stated that the chemical feed system is based on flow rate, so it maintains a consistent dosage within the reaction tanks. NRG Energy made some changes to the system dosages in July 2013 based on jar testing that was performed with some industry experts. NRG Energy stated that the testing was not a result of an exceedance event but was an attempt to optimize the system while the facility had time available.

NRG Energy stated that they are still using TMT-15 as the organosulfide in the system. The plant has done some jar testing with the Nalco and GE products, where GE products seemed to show better performance than Nalco. The facility decided not to switch to a different chemical because the system is performing well with the TMT-15. NRG Energy believes they can meet their NPDES permit limit for mercury (i.e., 0.004 mg/L (4,000 ng/L) monthly average; 0.008 mg/L (8,000 ng/L) daily maximum) without any need to add organosulfides; however, they continue to use TMT-15 in their system.

#### EPA Method 200.8 Data

Since January 2014, Keystone has been analyzing for arsenic and other metals using modified 200.8 (characterized by NRG Energy as a “more sensitive analytical method”). See 2/21/14 email from Stephen Frank. The following questions are related to the EPA Method 200.8 data that Keystone has available:

4. What is “modified 200.8”? Did it use a collision cell or DRC?

NRG Energy Response: NRG Energy stated that their laboratory, Geochemical Testing, recently purchased a new Agilent ICP/MS analyzer. The system has the capability to run EPA Method 200.8 with either a collision cell or reaction cell and provides lower method detection limits than EPA Method 200.7. NRG Energy stated that they were not sure which mode the laboratory uses to analyze the Keystone samples.

*Action Item:* NRG Energy will follow up with the laboratory to determine which mode (i.e., collision cell or reaction cell) the laboratory is using to analyze the Keystone FGD wastewater samples using EPA Method 200.8.

5. Which analytes are being analyzed by 200.8?

NRG Energy Response: Geochemical Testing is analyzing the FGD wastewater using EPA Method 200.8 for selenium, arsenic, chromium, and zinc.

6. For which dates are 200.8 data available?

NRG Energy Response: Analytical results using Method 200.8 are available starting from the second week in January 2014. They have weekly samples starting from that week (through approximately April 15).

7. What is RL and DL for arsenic using the 200.8?

NRG Energy Response: The laboratory has a detection limit for arsenic for EPA Method 200.8 that is 0.5 ug/L and the quantitation limits is 1 ug/L.

8. Are the arsenic observations detects or nondetects? What are the reported concentrations above the RL?

NRG Energy Response: NRG Energy stated the analytical results for arsenic using Method 200.8 are usually detections in the range of 1 to 4 ug/L. NRG Energy does not usually observe non-detects, but there have been a few instances where the samples have been diluted, raising the quantitation limit, and resulting in a non detect result. The highest non-detect quantitation limit that NRG Energy has observed was 5 ug/L.

NRG Energy stated that it would take them about a week or two to prepare the 200.8 data and provide it to EPA, including all the lab reports. NRG Energy stated that the lab reports only report down to the quantitation limit and do not include J-values or the sample-specific detection limit; however, the facility has on-line access to the results from an analytical database maintained by the laboratory, which contains associated J-values and method detection limits. NRG Energy stated that they could ask the laboratory to revise the lab reports to include the detection limit and J-values.

*Action Item:* EPA will get back to NRG Energy if they want them to provide EPA with the 200.8 analytical data.

#### Arsenic Data Included in February 2014 Submittal

The following questions and responses relate to the arsenic data that were submitted in the NRG Energy response to EPA's January 17, 2014 data request.

9. Confirm results for 7/24/12 and 8/12/13 are detects (as shown by the lab reports). These values were reported as detections at the exact quantitation limit.

NRG Energy Response: NRG Energy followed up with the laboratory regarding these results and determined that they were detections. Additionally, the laboratory gave NRG Energy more precise measurements (the previously provided values were rounded):

- 7/24/2012: 0.0212 mg/L
- 8/12/2013: 0.0237 mg/L

EPA noted that that detected values are an order of magnitude higher than the typical detections they are identifying using the 200.8 method. NRG Energy stated that it does seem like those results are outliers.

*Action Item:* NRG Energy will review the data from this time period and evaluate whether there were any unusual process changes happening in the system that may have led to the increased effluent arsenic concentrations.

10. Why is the RL for 200.7 at 20 ug/L and not a much lower concentration?

NRG Energy Response: NRG Energy's NPDES permit only has a "monitor and report" limit for arsenic; therefore, the plant wasn't too concerned with getting down to a low reporting limit. Based on discussion with the laboratory, 20 ug/L was the best the laboratory could do on a routine basis. NRG Energy stated that they had decided to have the laboratory use EPA Method 200.7 instead of EPA Method 200.8 because at the time they felt that 200.7 was a better method for arsenic analysis because 200.8 had issues with matrix interferences if a collision cell or reaction cell was not used and at the time, the laboratory did not have the capability to run Method 200.8 with a collision cell or reaction cell.

11. What is meant by ND ("U") for following dates which have this note: *"The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit"* ...but there is no concentration listed other than the DL and RL

- 4/10/12, 4/11/12, 4/12/12

NRG Energy Response: NRG Energy and EPA came to a conclusion that the language is likely intended to convey the following:

*“With confidence, the analyte was not detected at or above the detection limit, which is below the laboratory quantitation limit”*

12. Why is there a single result using EPA Method 6020 (<5 ug/L on 2/21/13)?

- What version of 6020?
- Was the analysis run using a collision cell or dynamic reaction cell?
- Do the 5 dilutions suggest that an undiluted analysis would have RL of 1 ug/L?
- Why is there no lab report for the 6020 result?

NRG Energy Response: NRG Energy stated that the EPA Method 6020 result was collected as part of a sampling event that was conducted by EPA Region 3 related to a hydraulic fracking study. NRG Energy collected a split sample with EPA Region 3 and used EPA Method 6020 because that was the method Region 3 was using. NRG Energy only analyzed one sample using this method and isn't familiar with the method or how the sample was analyzed. NRG Energy had forgotten about that analysis and hadn't thought to provide the laboratory report when they prepared the submittal.

*Action Item*: NRG Energy will provide EPA with the laboratory report for this result.

13. Keystone reported several J values in the data spreadsheet, but the J values do not appear to be reported in the lab reports:

- FGD Influent J values: 2/21/2012; 4/17/2012; 9/18/2012; 10/9/2012
- Outfall 101 J values: 6/5/2012; 6/26/2012; 7/3/2012; 7/31/2012; 9/5/2012; 8/19/2013; 9/3/2013; 10/21/2013.

NRG Energy Response: NRG Energy stated that the lab reports only report down to the quantitation limit and do not include J-values or the sample-specific detection limit; however, the facility has on-line access to the results from an analytical database maintained by the laboratory, which contains associated J-values and method detection limits. Additionally, NRG Energy stated that they could ask the laboratory to revise the lab reports to include the detection limit and J-values. NRG Energy noted that the laboratory's detection limit is typical one-half of the quantitation limit.

*Action Item*: EPA will let NRG Energy know if they need NRG Energy to provide the lab reports including the detection limit and the J-values.

14. Keystone's data spreadsheet includes two FGD influent results on 4/10/2012; however, there is only one laboratory report for the FGD influent for that date. EPA did not find a lab report with the reported value of 1,390 ug/L for the FGD influent on 4/10/12.

NRG Energy Response: NRG Energy stated that the second analysis was related to some additional compliance monitoring that was required.

*Action Item*: NRG Energy will provide EPA with the additional lab report.

15. The dilution factors for arsenic at Outfall 101 for several Dec 2013 samples (12/2/2013; 12/16/2013; 12/23/2013; 12/30/2013) were entered into the spreadsheet as 1, when the lab report shows 2.

NRG Energy Response: NRG Energy stated that they agree with EPA that the dilution factors for those dates should be 2, instead of 1.

#### Mercury Data Included in February 2014 Submittal

The following questions and responses relate to the arsenic data that were submitted in the NRG Energy response to EPA's request.

16. What is meant by ND ("U") for following dates which have this note: *"The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit"* ...but there is no concentration listed other than the DL and RL

- 4/10/12, 4/11/12, 4/12/12

NRG Energy Response: NRG Energy and EPA came to a conclusion that the language is likely intended to convey the following:

*"With confidence, the analyte was not detected at or above the detection limit, which is below the laboratory quantitation limit"*

NRG Energy also agreed that there should be a "<" for the three days identified in the question above because the results from those days were not detected.

17. Why is there a "U" qualifier for 4/15/13 instead of "J"? And why is it listed as a detected value (no "<" in Column J)? Confirm it is nondetected (either below the RL or DL).

18. The 4/15/13 entry suggests it is a detected value because there is no "<" indicator, but the 2500 ppt value is listed in the J-value column and the RL is 4000 ppt. Confirm this is ND.

NRG Energy Response: NRG Energy discussed this result with the laboratory and noted that the dilution factor should be reported as 25. NRG Energy stated that the detection limit and the quantitation limit are not properly reflected on the lab report. Based on the 25 dilution factor, the detection limit was 0.0025, which was the "result" reported, but it was missing the "<" sign. The result was in fact a non detect value below the detection limit, which means that it should also have a "U" qualifier.

19. Explain the cause for the 800ppt on 10/24/12 and 300ppt on 10/30/12. Note the weeks preceding and following are ND at 200ppt.

NRG Energy Response: NRG Energy stated that the concentrations could have been related to the outages that were occurring at that time, or it could be related to a process upset. NRG Energy stated that they would want to look at the TSS values to see if they had excess particulate in the effluent due to issues with either the clarifier or the gravity filters.

NRG Energy noticed that in the fall, they tend to have issues with biological growth in the gravity filters. This generally happens when the system is sitting idle and the water is stagnant in the system, which could have been occurring because of the multi-unit shut down. NRG Energy attributes the biological growth issues to the accumulation of leaves in the lake, which is the source of intake water for the plant. They do not typically treat the intake water prior to use.

The plant has used nonoxidizing biocides (starting in 2011) to remove the biological growths from the gravity filters. When there is excess biological material in the gravity filters, the sand tends to clump together and results in decreased performance of the filters. NRG Energy noted that there appeared to be five biocide treatments in October 2012, which according to NRG Energy, is a lot for a month. This indicates that the elevated concentrations of mercury measured on 10/24/12 and 10/30/12 may be associated with a treatment system upset due to biological growth in the sand filters.

*Action Item:* NRG Energy will check to determine whether they were doing some type of cleaning or other type of operational changes during this time period that could have led to the increased effluent mercury concentrations.

On May 5, 2014, EPA sent a follow up email to NRG Energy with the specific action items from the call on May 1<sup>st</sup> (see DCN SE04318A2). EPA requested that NRG Energy provide the additional information by May 16, 2014.

On May 16, 2014, NRG Energy provided EPA with the additional data, laboratory reports, and answers to questions requested by EPA. The following is a description of the information provided, as well as the associated DCNs for the information:

- Email to Ron Jordan (DCN SE04318A3);
- Updated analytical data for Keystone (including Method 200.8 data) (DCN SE04318A4);
- Analytical laboratory reports (DCN SE04318A5 through SE04318A24);
- Analytical trends for July 2012 (DCN SE04318A25); and
- Analytical trends for August 2013 (DCN SE04318A26).

On June 17, 2014, EPA sent NRG Energy a list of additional questions based on further review of the analytical data provided by NRG Energy to date (including the data submitted on May 16, 2014). The list of EPA questions is included in the record as DCN SE04318A27.

On June 26, 2014, NRG Energy provided EPA with responses to EPA's additional follow-up questions. The following is a list of NRG Energy's correspondence with EPA (with associated DCNs):

- Email to Ron Jordan from Stephen Frank responding to follow up questions (DCN SE04318A28); and
- Revised analytical laboratory report for April 10, 2012 (DCN SE04318A29).